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FEBRUARY 2016

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■ FIRST DRIVE: CUMMINS-POWERED
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The '17 Ford Super Duty gets new looks and new materials. Ford won't talk numbers at this time, but could we see 1,000 lb.-ft of torque? **F-250 Lariat** cover photo courtesy of Ford.

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GARAGE

BY MONICA GONDERMAN • PHOTOS: JASON GONDERMAN

That's a Wrap

I'm intrigued by wraps lately. And I'm not talking barbecue chicken wraps, although that would be delicious right about now. I'm talking about vehicle wraps—the ones that make ordinary trucks extraordinary.

Is it just me, or were wrapped vehicles everywhere at this year's SEMA? Standing highly visible amongst the rows of vehicles and hordes of people—and displaying an impressive amount of detail and pizzazz—wrapped trucks definitely had the "wow factor." My little game was to get up close and see what colors the trucks actually were. Whatever happened to paint? Remember when painted trucks seemed to be more of a thing at SEMA? Yes, there were some painted and pinstriped trucks, but ironically, I think I noticed them because they were not wrapped.

Don't get me wrong, I like wrapped trucks. I also like painted trucks. Likewise, some wrapped trucks are hideous, and some painted trucks are hideous. The plethora of wrapped trucks is merely an observation of a trend that may be applicable for the work truck world.

I have a custom flame-painted, pinstriped tonneau cover. I love the slightly raised texture of the pinstriping, also the faintly imperfect brushstrokes the freehand art of pinstriping creates. I love the deep, glossy finish the paintjob once had. You can't beat a good paintjob. At the same time, I'd wrap my truck in a heartbeat. I'm too attached to the original color to change it permanently, but a

temporary change, via a wrap, would be so cool.

Since both wraps and paint are subject to such a broad spectrum of quality, detail, and craftsmanship, it's impossible to say which option is cheaper or right for you, should you conclude that your business could benefit from either. There are simply too many variables. I can suggest that art-impaired individuals (such as me) should probably cross this off of the DIY list and leave it to professionals.

Have you considered wrapping your work truck? As you'll see in this issue, we recently wrapped our plain-Jane work van, and we have to admit that it turned out pretty killer.

Monica Gonderman

MGonderman@enthusiastnetwork.com



The offer to drive this '15 Ford F-150 Halo Sandcat SEMA specimen came via a voicemail accompanied by a few swift yet enticing stipulations: We must make a decision immediately, be available first thing the next morning, and be satisfied with 24 hours of playtime. Of course, we adjusted our schedules and obliged. We were told this promotion work truck—built at Galpin Auto Sports through a partnership between Ford and 343 Industries for the purpose of advertising the release of the *Halo 5* video game—drew more attention than many of Ford's other vehicles and gained astronomical popularity wherever it appeared. Although this rig is full of window-rattling electronics and rides on an aftermarket Addictive Desert Designs long-travel suspension, the thing that screams "look at me" the most is the custom full-body wrap. **WTR**

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Xtra Duty ½-Ton

I'm in the market to replace my current work truck. Don't get me wrong—although she's a beauty and quite the workhorse, she's definitely starting to show her age. Have you guys had a chance to drive that Cummins Titan? I'm intrigued.

Robert Landers

Des Moines, Iowa

Not quite a true heavy-duty (although with a curb weight as high as 7,480 pounds and a GVWR up to 8,800 pounds, the stout Nissan Titan XD has enough mass to qualify), but more truck than the typical ½-ton, the Titan XD is poised to fill in a blank space in the market that has essentially been abandoned by the traditional ½-ton trucks as they battle it out in the capability wars. Nissan will leave it up to your imagination as to what the "XD" stands for. We like to think of it as Xtra Duty, but you can think of it as a more livable, lighter-duty ¾-ton—a modernized version of the old Ford F-250LD or Chevy 1500HD trucks of yore.

The Titan XD you speak of packs the punch of an optional 5.0L V-8 Cummins turbodiesel churning out 310 hp and 555 lb-ft of torque, backed by a six-speed Aisin transmission. A 5.6L gas V-8 engine will join the lineup at a later date. The XD is capable of towing up to 12,314 pounds (as determined by the J2807 standard) depending on configuration.

With a push of the start button, the Cummins comes alive quickly and settles into the familiar but muted idle of a diesel. In fact, the new engine uses Bosch glow plugs borrowed from Cummins' V903 military 15.0L V-8 and will start in 2 seconds or less in temperatures as low as 32 degrees. Cummins, through the magic of Piezo injectors, has engineered in the ability to have up to seven

injection events per cycle, aiding the quietness of the engine. The Aisin transmission shifts with firmness and authority and feels well suited to the Cummins V-8. The original Titan's gated shifter has been replaced with a column shifter to free up substantial space for storage in the center console. With eight cupholders in the front and eight in the rear, including spaces large enough for 32-ounce Gatorade bottles in the open console, the Titan XD should have enough cup capacity for any job site.

Going down the road, the Titan XD feels heavy and substantial. The ride quality is taut and is neither too soft nor too harsh. It finds a middle ground that does a nice job of splitting the difference between ½- and ¾-ton trucks. The mass is apparent, but



PHOTO: ROBERT GUIDI

cornering is flat with safe understeer at the limits, and the grunty Cummins moves the 7,000-pound truck along smartly. Long gone from the Titan are soft brakes and a mushy pedal; in their place is a system with progressive action and good pedal feel. The XD's brakes feel every bit of their 14-plus inches in diameter. Steering effort is heavy, especially at low speeds, but it seems well dialed for the highway.

We drove the Titan XD with conventional trailers weighing as much as 10,000 pounds hanging off the back, and the truck feels as stable as anything this side of a Super Duty. The downhill speed control does a good job of maintaining speed with a load, and the Cummins engine happily hauls without complaint. As good as the system is, we hardly missed an exhaust brake but still wish Nissan would consider adding one for an extra level

of control. When compared to the true ½-ton competition, the Titan feels more solid, more planted, and more stable, with less push-around. It's a rock-solid towing platform, and a rear factory gooseneck setup is standard on all but the base model. There is even an accessory fifth-wheel hitch designed by Reese that uses the gooseneck crossmember mounting points.

During our testing, we saw about 17 mpg in mixed driving and roughly 20 mpg on the highway. Unfortunately, the fuel tank is a measly 26 gallons, with an equally small 4.5-gallon DEF tank. In our minds, there is no reason the Titan XD shouldn't have a 35-gallon tank and an 8-gallon DEF tank to extend the range of both fluids.

While pricing hasn't been announced yet, you can expect the crew cab, diesel-powered

XD to start in the mid-\$40,000s and top out with the impressive Platinum Reserve at about \$60,000. Considering an F-150 Limited is creeping close to \$70K and doesn't even have a diesel option, Nissan is pricing the Titan to be one helluva deal, no matter how you slice it. For those who want ½-ton livability with near-¾-ton capability, the Titan XD is a compelling choice. It's

a nice truck and worth a look. For our money, we'd lean toward the PRO-4X, which adds monotube Bilstein shocks, more aggressive all-terrain tires, and a locking rear differential.

Initially, the XD will be available in the crew cab body style with a 6.5-foot bed, but as production ramps up, regular and King Cab options will be available, along with other bed lengths and the aforementioned gasoline V-8. With capability and size that neatly splits the traditional ½- and ¾-ton segments, the Titan XD is poised to win over customers finding themselves in the middle looking for a quality truck that is just right for their needs. If you consider yourself one of these in-between buyers, you owe it to yourself to try out the Titan XD. It's the Xtra Duty ½-ton that stands out from the crowd with a mix of size, capability, and a diesel engine designed to work: a "heavy half" that's happy to live in the middle. [WTR](#)

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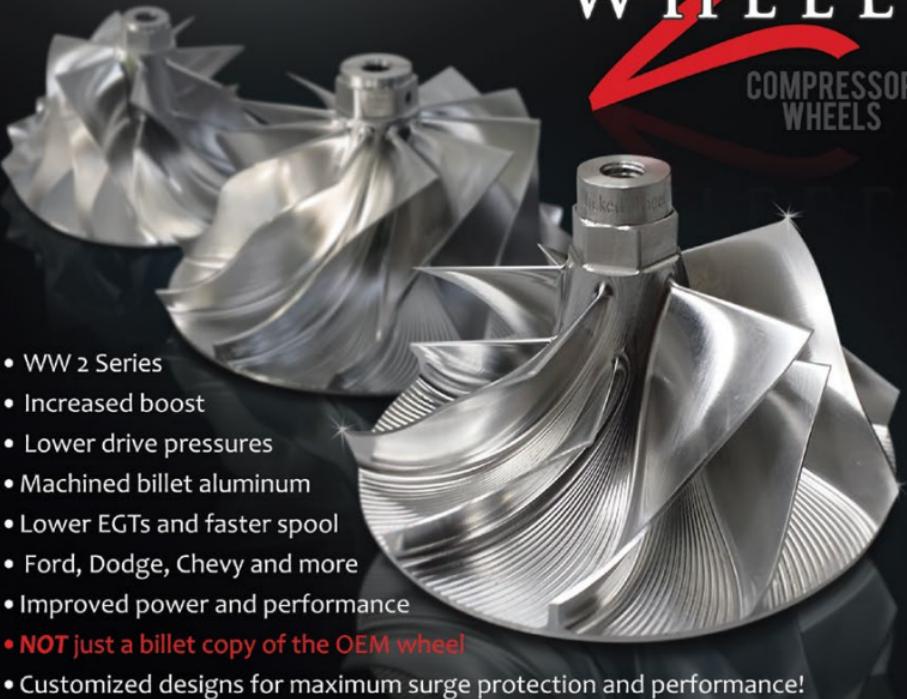


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POSTAL SERVICE IS GETTING PROMASTERS

The U. S. Postal Service will be taking on 9,113 '16 Ram ProMaster 2500 cargo vans that will be customized for national mail and package deliveries. This next-gen round of delivery vehicles becomes part of the postal fleet, which is about 190,000 vehicles strong. The new Rams will have the 3.6L Pentastar and six-speed auto trans.

A new survey by Kelley Blue Book has found that 97 percent of consumers think distracted drivers who are texting and talking while driving are the biggest safety concern. And despite the fact that 46 states ban texting while driving and 14 don't allow talking on the phone while driving, only 91 percent surveyed knew their local laws related to this. For the record, these types of drivers beat out drunks, road rage, and foul weather when it comes to drivers' fears.

AUTONOMOUS DRIVING ON THE AUTOBAHN

Daimler Trucks has officially taken its first series-production autonomous truck on public roads—the Autobahn 8 between Denkendorf and Stuttgart. The vehicle is based on a Mercedes-Benz Actros with Highway Pilot system. Minister-President of the state of Baden-Württemberg, Winfried Kretschmann, said, "The state government is currently planning to set up a test field for autonomous and partially autonomous driving, which will be open to any potentially effective technologies." The Highway Pilot has front-mounted radar, camera, and assistance systems such as adaptive cruise control.



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THREE NEW OPTIONS FOR KENWORTH TRUCKS

The vocational group of trucks over at Kenworth has new options. Allison's 4700RDS seven-speed transmission can be had on the T880, T800, W90, and C500. If you've got a T880, there's now a steel or aluminum box bumper, and its tapered design means hood pivot clearance and extra protection for the grille and headlight. Lastly, the W900S? With a PACCAR PX-9 in the set-forward front-axle configuration, a fixed grille is available. This should be good news for people like crane operators, since the front of the truck can be used and the hood can still be opened.

M-B UPFITTER PORTAL

UPFITTER
PORTAL

Welcome to the Upfitter Portal

Mercedes-Benz has kicked off upfitterportal.com for all that is upfitting, from photos and product info to videos and lists of upfitters. And the MasterUpfitter program means MasterUpfitters can learn special tech info and create a profile that Mercedes-Benz vans and Daimler vans dealers can search for when seeking upfit solutions.

RUGGED RIDGE'S TRAILER FOR 2016

Rugged Ridge will be rolling into events in 2016 with a 53-foot tri-axle gooseneck trailer, featuring its famous Jeep Wrangler Unlimited Mango and the slogan "We Make Jeeps Rock." The maker of parts and accessories will be using the custom trailer at off-road and Jeep events.



Lug Nuggets

•The first nine months of 2015? GM sold 7.2 million vehicles around the world.

•Who's the most in-demand employer? If you ask LinkedIn, Ford made the list of 100 most InDemand Employers for North America in 2015.

•Volvo Trucks North America has broken ground on its new Customer Experience Center as part of the New River Valley truck assembly plant in Dublin, Virginia. There will be a showroom, four training rooms, and an observation area to watch trucks on the also-new Customer Experience Track.



•Dick Ceppek Tires & Wheels redid its website to make it more mobile-friendly, plus added loads of photos, videos, news, and product info. And the Where to Buy section got even easier to use, plus there's a Buy Now option. Check it out at dickcepek.com.



•This could get interesting—the future-coming Jeep pickup might not be based on the Wrangler after all.

•Holley now owns the MSD Group, including MSD, Edge, Mr. Gasket, and Superchips.

•A report by the American Trucking Association shows there's a shortage of truck drivers, to the tune of 48,000. The report also noted that over the course of the next decade, the trucking industry will need to hire 890,000 new drivers.

PETERBILT'S NEW RED OVAL PRE-OWNED TRUCKS

Peterbilt is now offering the Red Oval program—certified pre-owned trucks from its dealer network and PACCAR Financial Used Truck Centers. Each truck has an inspection and a factory-authorized warranty, and qualifying trucks will have fewer than 450,000 miles and be four model years old or newer. Shop at peterbiltredoval.com. **WTR**



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BY BRETT T. EVANS

Work Products



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Cheap Fun

Sure, you could go down to your parts dealer and get some off-the-rack bumper to install on your truck, but that's boring, expensive, and unoriginal. The alternative? A weld-it-yourself unit from MOVE Bumpers. The MOVE bumper's parts fit perfectly, giving the owner a fun weekend project welding it all together. MOVE bumpers are also available with and without lightbar holes and winch mounts,

and the company will supply lights to the customer as well. They're available for many eight-lug trucks, vans, and SUVs, as well as some light pickups.

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Cutting Edge

The Edge Products CTS is being upgraded for 2016 and getting a new name: CTS2. Along with the second-gen update comes superior graphics and a slimmer case design. The full-color 5-inch display also delivers zero glare, and an HDMI plug helps with linking certain accessories. The Edge user can customize the display's colors and backgrounds, and a new smartphone-like screen-swipe function allows for navigation through the tuner's displays.



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Cold Shop, Warm Jacket

This author's shop ain't heated, so doing any kind of work during the winter can be brutal. But Dickies' new Insulated Shop Jacket is just the ticket to prevent work-related chills. Like the brand's Eisenhower jacket, this new one is water-resistant, and the full zipper, adjustable cuffs, and adjustable waist tabs keep body heat in and cool air out. It also heralds a new era in Dickies fashion, with modern colorways and a bike-jacket-inspired design you'll want to wear outside the shop, too.

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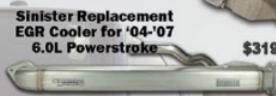


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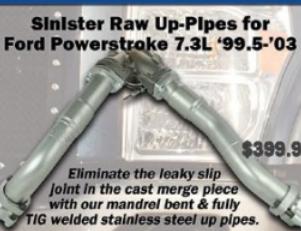
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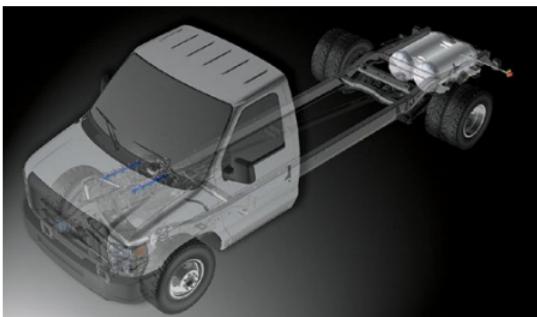
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BY SEAN P. HOLMAN • PHOTOS: COURTESY OF FORD MOTOR COMPANY

The New Class Of Working Class





FIRST LOOK AT THE 2017 FORD SUPER DUTY

Apple, Boeing, GE, Microsoft, Nike—all American companies that have a history of innovation that revolutionized the industries they competed in. Not to be left out of this esteemed group, of course, is Ford Motor Company. One can look back on Ford's lengthy history and pinpoint such significant events as the mass-produced Model T, the V-8 engine, and the Mustang. For truck guys, the '99 Ford Super Duty is yet another one of these revolutionary milestones on Ford's historical timeline. It's a truck that set new capability standards in the market and redefined what "heavy duty" could mean to the buyer, while helping solidify the company's 38 years of truck sales leadership.

Like a cannonball into the kiddie pool, the original Ford

Super Duty made such a splash 17 years ago that the truck market was forever changed. Breaking the heritage of sharing its cab with the F-150, the Super Duty brought a vehicle so large and so much more capable to market that it was its own class of truck. With 44 configurations and GWRs all the way up to 19,000 pounds in the F-550, the Super Duty had the heavy-duty truck market covered. Such a departure from the then-current norm of using the same platform for a $\frac{1}{2}$ -ton as a $\frac{3}{4}$ - or 1-ton, it's a truck that reinvented an entire segment. A quote from the Feb. '98 inaugural issue of *Truck Trend* sums it up: "The Super Duty will have horse haulers drooling, snow-plow operators sprouting dry heaves, and anyone who tows their classic to shows contemplating whether Ford dealers will take a kidney as a down payment."

THE NEW CLASS OF WORKING CLASS

Using the same basic platform and cab for 17 years, the Super Duty has been refined and improved to ensure it remained relevant in the hotly contested truck space. It's remarkable to note that aging Ford claims 43 percent of the registrations in the 8,500-to-14,000-GVWR segment, while nearly 65 percent of new chassis cabs sold are Fords. Clearly the heavy-duty market is hugely important to the success of Ford Motor Company.

Overview

For the '17 model year, the Super Duty is enjoying its first complete redesign in nearly two decades, with what Ford is calling the "most significant product action" in 17 years. While the basic aluminum body structure is shared with the handsome F-150, the front clip, hood, fenders, lights, and beds are all unique to the Super Duty. The new "mil-spec" aluminum body is stronger than the old steel body and more dent resistant. In order to handle higher loads, the Super Duty uses thicker gauges of aluminum in key areas. For example, the Super Duty's 8-foot box has 14 percent more aluminum by mass than the F-150's comparable box. A new floor pan pattern with wider, deeper beads is also thicker, as are the box inner bed panels and the D-pillar. The beds use stronger crossmembers and a new one-piece sill reinforcement.

So how much would you guess the Super Duty's mass benefited from the switch to aluminum? It would stand to reason that if the F-150 is in the 700-pound range, the Super Duty must be 800 or 900 pounds, right? Well, not exactly. Ford pegs the number at somewhere around 350 pounds net. So what happened to that extreme diet? The answer is simple: Ford reinvested the weight savings right back into capability, while still light-weighting to an impressive degree.

Because the switch to an aluminum body resulted in such a massive weight savings (Ford says more than 500 pounds from the old steel body to the new aluminum one), the company focused on increasing already stellar capability. Ninety-five percent of the fully boxed frame is made from high-strength steel, using rails that are 1½ inches taller, resulting in a frame stiffness that is up to 24 times higher than the old frame. Other improvements include larger axles, a heavier-duty drive-line, bigger brakes, and tougher transfer cases. Additionally, all Super Duty trucks now come standard with weight-carrying hitches.

While the company won't be releasing hard numbers until next year, the new truck is being referred to as the most capable Super Duty ever. Ford tells us these trucks will have the highest payloads and highest fifth-wheel/gooseneck/conventional towing rating of any Super Duty to date. As the year progresses, we are sure those claims will expand to include best-in-class bragging rights.

Powertrain

You won't find any EcoBoost engines lurking under the Super Duty's aluminum hood, as Ford has decided to stick with the familiar for its powertrain offerings. Carrying over are the 6.2L gas V-8, 6.8L gas V-10 (chassis cab only), and potent 6.7L Power Stroke diesel V-8. An all-new six-speed transmission, which Ford is calling the TorqShift-G, will also debut behind the 6.2L V-8. The rest of the lineup will get a version of today's six-speed 6R140 TorqShift transmission.

Ford hasn't released many details about improvements or power outputs of these engines, but we do know the SOHC 6.2L V-8 will benefit from larger intake valves and dual-equal variable cam timing. It will also be E85-capable and available with a CNG/propane prep kit (as will the three-valve V-10 on chassis cabs).

The biggest unknown is just where the popular 6.7L Power Stroke



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The cab of the '17 Super Duty is a massive improvement over the current model in terms of design and materials, with a theme that manages to be both industrial and refined.

V-8 will end up in regard to horsepower and torque. Ford tells us we can expect "improved performance" and fuel economy but nothing to indicate to what extent. We've heard over and over again that Ford has its sights set on being the first manufacturer to reach 1,000 lb-ft of torque. We believe it to be highly likely that the company will reach that number, along with around 450 hp, but it's all conjecture until Ford decides to make an official announcement.

Exterior

One of the controversial new features of the Super Duty is the vertical placement of the model name in the functional fender vent. We've never seen the F-Series use this type of treatment, and being on a black background doesn't allow the color of the vehicle to come through the logo as it does in the F-150. This new design touch might be one that takes us a while to get used to.

Features we love are the LED bed-lighting system, the latest version of the tailgate step, Ford's Tough Bed spray-in liner, and Ford's new BoxLink storage and cleat system. The shortbed of the Super Duty also retains the front stake pockets, something that is curiously lost on the F-150 and a shortcoming for those who use bedrail-mounted racks for work or action sports.

Interior

Using the F-150's body has benefited the Super Duty with up to 4 additional inches of cab length over the outgoing truck, resulting in a roomier cabin. The Super Duty also shares the dash and totally flat rear floor with its $\frac{1}{2}$ -ton brother, but it adds some unique storage solutions, such as a two-tier glovebox and dividable and locking rear underseat storage. The higher-amperage upfitter switches have been moved to the overhead console and now total six, two of which are powered at all times. Other items shared with the F-150 are an 8-inch productivity screen, improved trailer brake controller location, multi-contour seats with optional massaging function, and

While the aluminum main cab structure is largely shared with the F-150, the front fenders, nose, and bed are unique to the Super Duty.

inflatable rear safety belts. You can now get up to two 400W/110V power outlets.

Technology

Perhaps the biggest story about the Super Duty is just how loaded with technology it is. At the heart of these upgrades are up to seven high-resolution cameras. A forward-facing camera in the grille, side-view cameras in the mirror bases, and a new camera in the taillate work together to provide the 360-Degree View with Split-View system introduced in the F-150. A new center high-mount stop light (CHMSL) camera is available over the bed to make hooking up a gooseneck or fifth-wheel trailer easier, even including a new zoom feature so you can see the hitch. A remote-mount rear camera can be placed on the back of your trailer to make reversing maneuvers easier, giving you visibility never before possible when towing. In fact, Ford has included a new

"The new 'mil-spec' aluminum body is stronger than the old steel body and more dent resistant."





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color-coded trailer coaching system to alert the driver if trailer angle becomes too tight or close to jackknifing. Finally, a forward-facing camera at the top of the windshield provides lane departure warnings and facilitates adaptive cruise control, a feature that is now tied into the exhaust brake for exceptional downhill speed control.

In addition to the cameras, the Super Duty is now equipped with blind-spot monitoring, and unlike the F-150, it remains functional when a trailer is attached. Tire pressure monitoring will now have the ability to monitor trailer tire pressure.

About the only thing the Super Duty doesn't have is the F-150's Pro Trailer backup assist. Unfortunately, the Super Duty chassis isn't equipped with the same electric-assisted EPAS steering setup as the F-150, so the capability isn't baked into the platform as it is on the ½-ton trucks. However, it will use a new adaptive steering system that will be able to adjust to different driving situations and reduce the amount of steering input needed, depending on speed and load.

The Super Duty will also benefit from the all-new and much-improved Sync 3 communications and entertainment system, along with support for Siri Eyes Free.

Chassis Cab

Not to be forgotten, the F-450 and F-550 chassis cab models also receive a full upgrade. High-strength steel framewalls are boxed to the back of the cab, before transitioning to C-channel the rest of the way for easy upfitting, and additional crossmembers are added for big increases in strength. Just as with the rest of the Super Duty lineup, the chassis cab models benefit from aluminum body construction and a number of features available in the pickup model.

Initial Thoughts

With regular cab, SuperCab, and SuperCrew cabin layouts; two drive types; 6½- and 8-foot bed lengths (or a chassis cab); F-250, F-350, F-450, and F-550 models; and XL, XLT, Lariat, King Ranch, and Platinum trim levels, the dizzying array of choices available with today's truck essentially carry over for '17. The virtually limitless combinations should mean there is a truck available for every conceivable need.

On a side note, we'd venture to guess that the 350 pounds of weight savings will back the curb weight off enough from the 14,000-pound GVWR for the F-450 pickup that Ram will have to drop the company's protest of the F-450 being in a higher weight class, but we are interested to see the response. No doubt Ram is readying one.

Our only negative takeaway was that the Super Duty lacked some of the features already present on the competition's offerings. No options for air springs, in-bed storage, or bed-mounted power outlets seem like potentially missed opportunities, but we doubt the consumers will care much considering just how many class-exclusive features are available. We also wonder if the F-250 will see a detuned, higher-economy version of the Power Stroke engine to better compete with the upcoming Titan XD. We think consumers in the market for middleweight capability would clamor for such a truck.

From what we know so far about the new Super Duty, there is a lot to be excited about, with much, much more news to come. Ford assures us we won't be disappointed by the end results, which are a quieter, tougher, smoother riding, more capable, more powerful Super Duty.

The truck is deserving of the 13-inch Blue Oval on the grille and poised to carry FоMoCo into the next chapter of the heavy-duty pickup wars, with Ford hoping history will continue to repeat itself. **WTR**





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BY JASON GONDERMAN

PHOTOS: JASON GONDERMAN



WHERE THE 5.0S ARE BORN

CUMMINS COLUMBUS
ENGINE PLANT TOUR

There has been a lot of exciting news in the truck world these past couple of years, and it doesn't look to be slowing down any time soon. Certainly the most anticipated has been from Cummins, by way of Nissan. Two years ago, we were introduced to the all-new Cummins ISV 5.0L V-8 diesel engine and were told there was a manufacturer with real plans to bring it to market in a light-duty pickup. Half a year later, the Nissan Titan XD was announced. While it's been a long road, and we have just recently gotten behind the wheel of a 5.0L Cummins-powered Titan, there have been some exciting stops along the way.

Back when the ISV 5.0L was first launched in Columbus, Indiana, the folks behind the engine took us on a tour of their newly built production facility. Not all of the machines were in yet and only small samples of engines had been produced, which were mostly handbuilt. Fast forward two years and we're back at the Columbus Engine Plant (CEP). However, this time the assembly line is complete and engines



Nissan is the first pickup manufacturer to partner with Cummins on the 5.0L V-8 Turbo Diesel engine. Despite what the Internet says, there is no exclusivity between Nissan and Cummins, leaving the door wide open for other OEMs to join the party if they so choose.

are rolling off of it. Before you get too excited, the plant is still technically in pre-production mode. What this means is the assembly line is complete and engines are being built, but it's at a much slower pace than full production, and changes to process, procedure, and product are all still being implemented. By the time you read this, the plant will be running at full steam.

There are two variations of the 5.0L V-8 being built at CEP: one for industrial use and one for the pickup market. The two engines have a lot in common, and ultimately the only differences are found in the turbochargers, front accessory drive, and ECM tuning. In Cummins' language, "ISV" refers to the industrial application V-8, while "5.0L V-8 Turbo Diesel" references the engine built specifically for the pickup market.



High-tech automation is the name of the game in this day and age. Raw engine block castings (from Brazil) and head castings (from Mexico) enter the facility and are sent through a fully automated machining process. This extremely precise process is monitored at every step by computers and robots, and are verified by humans to ensure each block and head meets the strictest of guidelines.



Within the walls of the Columbus Engine Plant resides a full research and development facility, complete with its own test cells. Seen here is an engine that has been fully instrumented and is prepared for several very long days of extreme testing and validation work.

The Columbus Engine Plant dates all the way back to the early 1900s and served as the site of founder Clessie Cummins' first engine production facility. Over the years, additions have been made, with the plant reconfigured dozens of times, but the original section of the plant is still in use and identifiable by its wood beams and riveted structure. The plant's previous resident was the 15.0L ISX. Assembly of the ISX was moved to New York, but machining of the head and block remain at CEP. Along with ISX machining, CEP handles the block and head machine work for the 5.0L, assembly of the M-Squared turbochargers for the 5.0L, and final assembly of both variants, the ISV and 5.0L. At full-tilt, the plant will be able to churn out between 200,000 and 300,000 V-8s per year (depending on who you ask), and the allocation of ISV and pickup engines can be changed on the fly depending on demand.

We are beyond excited for this engine to finally see the light of day. The Cummins 5.0L V-8 is high-tech, modern, powerful, quiet, and



Subassemblies, such as the air handling unit, front cover, and M2 turbocharger are built on lines much like this one. Once complete, they are transferred to the Common Block, ISV, or pickup assembly lines for installation on the engine.



Automation is utilized at all steps throughout the assembly process and ranges from robots that complete a task completely autonomously to torque and turn sensing guns used by humans for tightening bolts. Each engine carries with it a digital "birth certificate," which lists such detailed information about the engine that the torque of a specific bolt can be pulled up at any time.

adaptable; all the things truck builders are shopping for in an engine these days. And once word gets out, we're certain this plant will be humming along as fast as it can for decades to come. And we can't wait to come back and see this beauty running in full glory.

WHERE THE 5.0s ARE BORN



The finished block and heads come out looking like works of art. Each piece is stamped with a 2D serial number that enables tracking through the entire machining and assembly process. Once machining is finished, the block and heads are introduced to the Common Block assembly line, where the pieces that are common between the ISV and pickup engine are assembled.



The pistons enter the facility with their rings already in place. Rods are then attached, and the completed assembly is installed into the block the old-fashioned way: by hand.



On the Common Block assembly line, the heads are mated to the block, and camshafts, timing chains, glow plugs, oil pan, front cover, and any other part the ISV and pickup engine have in common are installed. Once complete, the blocks shift to either the ISV or pickup line to have their specific turbocharger, injectors, accessories, and anything else unique to the engine's application installed before heading off to cold and/or hot testing.



Seen here are completed front cover assemblies being loaded for transport to the engine assembly line. Employees are divided into teams and trained on their specific sub-assembly. These teams create accountability and ownership that ultimately translate into a safer, happier, and more mistake-free work environment. **WTR**



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RACKE'S '55 CHEVROLET PANEL VAN

RAPID TRANSIT



BY JASON SANDS • PHOTOS: JASON SANDS

Mike Racker is no newcomer when it comes to building clean-looking, powerful vehicles. He built an immaculate Duramax-powered Chevelle back in 2007 that was featured in Diesel Power and Popular Hot Rodding—it even

made the cover of *Hot Rod*. While the Chevelle made a big splash, Mike still needed something to haul classic parts, pieces, engines, and transmissions around. With that goal in mind, he went about building the ultimate Duramax-powered hauler.

Although Mike liked trucks, he already had a pickup, and the enclosed cargo space of a

van really appealed to him. Since the classic Chevelle was a hit, Mike decided to go the old-school route again. He owned a '55 Chevrolet 3800 panel truck, but the chassis, steering, and suspension were ridiculously outdated. Since it needed a drivetrain, he ended up buying an '07 Chevrolet Express van for \$3,500 to use as a donor vehicle. After chopping up the



van and selling parts on eBay and Craigslist, Mike was basically left with a free, running platform. "We actually drove it around a little like that," Mike says. "It was pretty fun!"

After eyeballing the '55 and what was left of the Express, Mike decided the best plan of action would be to integrate the older body with the newer van's chassis. "As luck would have

it, they were the exact same wheelbase," Mike says. "I didn't plan it that way; that's just how it turned out." Even though the swap looked fairly straightforward, Mike still didn't like certain parts of the panel truck. "The bumper and license plate stuck way out, it had a single rear taillight, and none of the body panel gaps even lined up," he explains. With a smoothed-out look

RAPID TRANSIT



The 600hp 6.6L Duramax engine in Mike Racker's '55 Chevrolet panel van is anything but boring. Aside from a complete rebuild with a host of performance parts, virtually everything has been painted, smoothed, chromed, or polished to give the diesel a classic look.

in his head, Mike started the bodywork to make it happen. The rear fenderwell was chopped and altered to clear the rear tires, the license plate was sunk into the rear door, the hinges were relocated, and '66 Chevy truck taillights were added. Mike also took the time to smooth the firewall and create a custom core support for the project. The whole engine and transmission assembly was even moved 2 inches toward the driver side to better center the 6.6L Duramax powerplant in the engine bay.

As if all this work wasn't enough, Mike decided he didn't trust the '07 van's 4L85E automatic transmission to handle the type of power he wanted to make. "I found an '06 Silverado in the junkyard and completely cannibalized it," he says. The Silverado donated its Allison 1000 transmission, floorpan, dash, and entire wiring harness to the project, effectively making the vehicle a conglomeration of three different donor GM platforms.

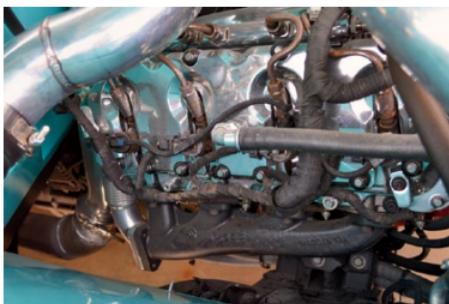
"The Chevelle was fun because it had some power in it," Mike says. "So I wasn't going to let this one be stock." Since the van already had 200,000 miles on it, Mike decided to take the Duramax apart for a complete rebuild. The factory crank was retained, but Carrillo rods were added for strength, as well as ARP head studs. The factory cam was replaced with a SoCal Diesel piece, and the cylinder heads are from Wagler Competition Products, with valve covers of Mike's own design. To further enhance reliability and aesthetics, a complete ARP bolt kit was added, as were up-pipes and exhaust manifolds from Pacific Performance Engineering.

After rebuilding the engine, Mike turned his attention to turbocharger, fuel, and transmission upgrades. A Garrett GTX4088R turbocharger was a quick-spooling option that could still produce plenty of power, and the fuel system was supplemented with a PPE lift pump and Dual Fueler kit. The engine runs on stock injectors "for now," and tuning comes courtesy of a PPE Hot-2 E.T. Race Xcelerator programmer. The Allison 1000 automatic transmission is rebuilt with PPE's top-of-the-line Stage 6 treatments, including competition clutches, a revised valvebody calibration, and a performance triple-disc torque converter.

With the powertrain complete, it was up to Mike to put everything together. After countless hours of wiring and welding, Mike was left with a one-of-a-kind classic that's been infused with all sorts of new technology. "It turned out great!" he says. "It gets more than 20 mpg, has twice the room of a regular pickup, and can spin the tires at will." Best of all, Mike's '55 has already been used to haul everything from parts to lumber, turning heads wherever it goes.



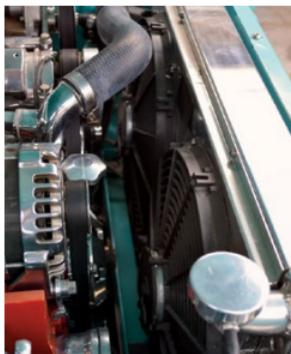
A Garrett GTX4088R ball-bearing turbocharger was mounted in the valley of the engine using a PPE kit and Wagler Competition Products intake manifold, and it makes an estimated 35 psi of boost. A 3-inch downpipe sends engine exhaust through a 4-inch exhaust system and muffler.



With the engine moved 2 inches to the driver side, there was plenty of room for high-flowing PPE up-pipes and Mike's own custom valve covers, which he makes through his company, Hi Tech Classics.



For times when Mike wants to turn the wick up on power, a PPE Dual Fueler kit was added. The pulley is custom-polished by Mike, who states that it took "three tries to get it right."



Since he planned on hauling and towing with the '55, Mike spared no expense on the cooling system. A custom radiator from Mattson's Radiators along with twin Spal fans keep the big diesel cool.

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RAPID TRANSIT



An interesting bit of old and new is hidden in the front of the truck. While the '55 may look original, such tricks as one-off headlights were retained and powered using the '06 Silverado wiring harness.

Perhaps the lion's share of the bodywork was performed at the rear of the '55, where the bumper was tucked in, '66 Chevy pickup taillights were added, the door was smoothed and hinges relocated, and the license plate was incorporated into the rear door.



A surprising amount of work can be found under each fender. A small, sturdy Frozenboost intercooler (pictured) is mounted in the passenger-side wheelwell and cools the charge from the turbo before the air enters the engine. The driver-side fenderwell holds the Duramax engine's computer systems.

Mike spent a lot of time reshaping the panel van's rear wheelwell so it would clear the slightly wider track of the later-model chassis. The wheels are newer Chevy steel wheels that have been sprayed turquoise.

SpecSheet

- **YEAR/MAKE/MODEL:** '55 Chevrolet 3800 panel truck
- **OWNER:** Mike Rakee
- **HOMETOWN:** Fullerton, California
- **ODOMETER:** 205,000 miles
- **ENGINE:** 6.6L Duramax V-8, Carrillo rods, ARP head studs and bolt kit, SoCal Diesel camshaft, and Wagler Competition Products cylinder heads
- **FUEL:** PPE lift pump and Dual Fueler kit, and Hot+2 E.T. Race Xcelerator programmer
- **AIR:** PPE up-pipes and Garrett install kit, GTX4088R turbocharger, Wagler intake manifold, and owner-built air intake and intercooler piping using a Frozenboost core
- **EXHAUST:** Custom 3-inch downpipe and 4-inch exhaust system and muffler
- **TRANSMISSION:** '06 Allison 1000 automatic with PPE Stage 6 rebuild
- **HORSEPOWER:** 550 to 600 hp (est.)
- **TORQUE:** 1,000 lb-ft (est.)
- **TIRES:** 225/75R16 Michelin LTX MS2
- **WHEELS:** 16x7 GM steel wheels with van hubcaps
- **AXLES:** Factory 10.5-inch, with 3.42 gears and a custom-made two-piece driveshaft and carrier bearing assembly
- **BODY:** Smoothed inner fenders and firewall, re-arched rear wheel openings, sunken license plate, shaved door hinges, and '66 Chevy pickup taillights
- **FACT:** Sometimes it's hard to keep track of what came from where on Mike's truck. The CliffsNotes are: The body is a '55 panel truck; the engine, frame, suspension, steering, and floorboards are from an '07 Chevrolet Express van; and the firewall, transmission, steering column, seats, and wiring harness are from an '06 Silverado. **WTR**

The floorboards say "van," but the sidewalls say "'55 Chevy." It took quite a bit of welding and trimming to fit the floor within the confines of the older body, but Mike did a nice job of making it work.

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JET POWER

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"You ready?" Tim Arfons asked. Suddenly, the world around us began to swirl, accompanied by the loud, high-pitched whirring sound of a jet airplane that made me feel like it was in my back pocket and we were in the center of an F1 tornado. Leaves and ground debris flew sideways through the air in a large radius and the Ford F-250 vibrated on its wheels. Tim cautioned, "Don't get out of the truck!" When I asked why, he laughed. "You'd get blown across the river!" he explained, pointing off to the distance.

I was in the rural outskirts of Akron, Ohio, with Tim "Turbo" Arfons,

testdriving one of his work trucks: a Ford Super Duty with a jet-powered track dryer strapped into the bed. The bones of the track dryer is a General Electric CJ610 Business Jet engine that produces 3,000 pounds of thrust operating at 80 percent, sending out air at up to 600 mph—"just under supersonic," explained Tim. That said, I was happy to watch safely ensconced in the pickup's cockpit!

The son of legendary, three-time land speed record holder Art Arfons, Tim cut his teeth in the speed business. His playground was his dad's garage, where he became adept at sorting bolts, reading engine manuals, and learning from the ground up about machines and motors. He was nine when his dad broke the land speed record. "He had a jet



JET POWER



"Dozens of jet engines litter the shop in all sizes and configurations and top out with a cruise missile engine."

car and gave me a mini-bike," Tim reminisced with a chuckle while giving me a tour of his dad's shop, which has been a part of his life for five decades. "My dad was a genius and ahead of his time.

"I didn't think I'd be in the same shop for 50 years," said Tim, who is humble and works out of a modest and unpretentious small compound of buildings that could serve as an automobile museum with artifacts, photos, and memorabilia from his dad's and his own careers. The workshop's rich aroma of fuels, oils, and metals makes a potent and appealing blend, especially when mixed with the slightly musty smell of books, prints, posters, and papers that are collected on walls, desktops, and in glass cases, rather than stored. Dozens of jet engines litter the shop in all sizes and configurations and top out with a cruise missile engine; it's an automotive historian's and enthusiast's dream garage. There's even a General Electric T258 jet engine on Tim's mailbox that



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JET POWER

is posted along the roadway in front of his shop. It's the same engine Tim used in his dragster, in which he just posted a speed of 201 mph (although the speed demon has gone faster).

Tim started out on the dragstrip, driving his Green Monster Camaro and Starfire funny cars. The stunt driver, whose wife asked him to give up racing when his son TJ was born, has now spent 40 years designing, building, and servicing jet engines. A wiz in the arena of power, electricity, and making motors work, Tim uses jet engines for things that "fly" on the ground, having turned his passion to turbine engines and putting them in everything he could—from a bar stool with a JFS 100 jet engine that he ran to a top speed of 43 mph on an eighth-mile track (and a 50-mph top speed) to unique and crazy jet-powered quad racers. It's no surprise that the expert is called frequently with questions on jet engines.

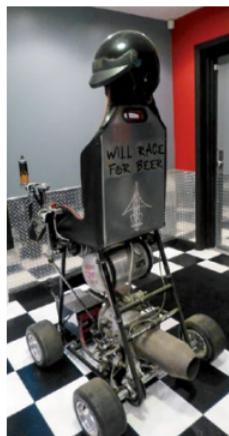
"This wasn't life-threatening stuff," Tim enthused, downplaying his years of competition. "Just the broken bones kind of stuff." The reference is to a crash in France, when he was motoring a jet-jumper that had the range to clear 15 cars. Tim flew over 14½ and broke a number of bones and separated his shoulder—one of two "spectacular" crashes Tim survived. The small jet-powered vehicle was launched by a catapult. "It was like launching off an aircraft carrier, with a 20-foot length of rope that stretched like a rubber band," Tim described. "The ramp had a 500hp turbine engine that propelled the cable. It was fine for jumping 10 cars, but my ego got to me and, wanting to do more, I tried 15. I should have stayed at 10!"

That was when Tim moved to the jet dryers. "The jet dryer was around and many dryers were made from extra engines racers had at home," Tim said. "I didn't invent them, but after getting calls to work on other



Specs and Design of Track Dryers

- Dryers use the General Electric CJ610 Business Jet Engine.
- Engine intake is in the truck bed to keep it clean and increase the longevity of the unit.
- Each dryer is custom designed to fit the needs of the client.
- The design for dragstrip use differs from road course and superspeedway use.
- Dryers can either be permanently installed or slide in and quickly mounted and then can be removed, so the truck can be used for other tasks—a development originated by Tim.
- Tim also builds trailer dryers.
- The custom fuel system is purposefully simple to allow the operator to focus on "race traffic," which can go by at up to 200 mph.
- Dual electric starters enable Tim's dryers to start cooler and faster, eliminating hot starts.
- The fuel system also features an on-board dump, making it easy to transport the dryer from track to track safely.
- Tim has designed his dryers to run on kerosene, rather than gas, to increase safety.
- Dryer batteries stay charged using the truck's alternator.
- Dryers are built with "off-the-shelf aircraft items."
- Each unit comes with high-speed, high-temperature, and low oil pressure warnings.
- Tim's newest design is a small-yet-powerful jet engine the size of a snowblower, which he calls a "cleaning jet" that comes at a lower price point and is a lighter-duty alternative to top-of-the-line dryers.
- Tim offers 24-hour customer service to answer tech questions and troubleshoot his products.



What Has Tim Put A Jet Engine In?

- ⇒ ATVs/quads for racers, including "Diamond Dan" and his jet-powered quad Psycho, who has appeared on *Monster Garage*, *World of Outlaws*, *Good Morning America* (Canadian version), and more: jetatv.com
- ⇒ Bar stool
- ⇒ Personal watercraft, where he posted a top speed of 198 mph
- ⇒ Robots



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people's stuff, I decided to make my own, perfect it, and start the Akron Turbine Group." Today, Tim is known around the globe for his work. He sells and rents his jet-powered track dryers for use at dragstrips and speedways throughout North America. He currently owns two Super Dutys that are his favorite trucks for setting up his dryers; both are stock with 20-inch wheels.

So, what exactly is a track dryer? Tim's Akron Turbine Group's Turbo Heater/Dryer is the only heater/dryer designed exclusively for the asphalt and construction industries. "Instead of waiting for surfaces to dry naturally, you get back to work in minutes or hours instead of days or weeks, even in tough weather situations," Tim pointed out. For example, dryers heat and dry track surfaces, removing moisture and debris in minutes so weather doesn't hold up races.

They can also be used to remove snow and ice, as well as to heat pavement before striping. Exclusively made and marketed for the race industry, Tim's user-friendly design dries up to 20 million Btu. "The Turbo Heater Dryer is a secret weapon race track operators have used for years, and now contractors around the world are using it to out-distance the competition year-round. Dryers can be custom-ordered for specific uses."

It's no surprise to learn Tim has the largest inventory of jet motors and spare parts and is considered a top authority worldwide. He not only rents and sells his dryers, he also trains jet dryer operators and is continually innovating with new designs for enhanced safety. He is currently working on a new cleanup jet dryer that carries a very small amount of fuel—30 gallons of kerosene vs. 200 gallons of fuel.

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Art Arfons

Born in 1926, Art grew up working on farm machinery before joining the Navy in 1943, where he specialized in diesel mechanics. Back home in Ohio, he and his half-brother Walt got into drag racing and started building the first Green Monster race car. The two worked together until the '50s, before going their separate ways and competing against each other.

In 1960, Art first raced his aircraft-powered Anteater at Bonneville and achieved a top speed of 313.78 mph the following year. As jet engines became popular in civilian aircraft in the '60s, Art started experimenting with them in his cars. Cyclops was his first jet-powered car. It produced 8,000 hp with a top measured mile speed of 330.113 mph. The open-cockpit car is still considered the fastest



of its kind, although its design positioned the driver directly in the air intake, so that there was no way to enclose the cockpit and still supply air to the engine, which limited the top speed. In deference to Cyclops' less-than-perfect aerodynamics, Art introduced another innovation—the first land speed record vehicle using a wing to produce downforce, preventing it from becoming airborne.

In 1964, Art drove his Green Monster, powered by an "F-104 Starfighter jet engine with four-stage afterburner" turbojet, to the land speed record three times within the next year. It ran at a speed of 576 mph.

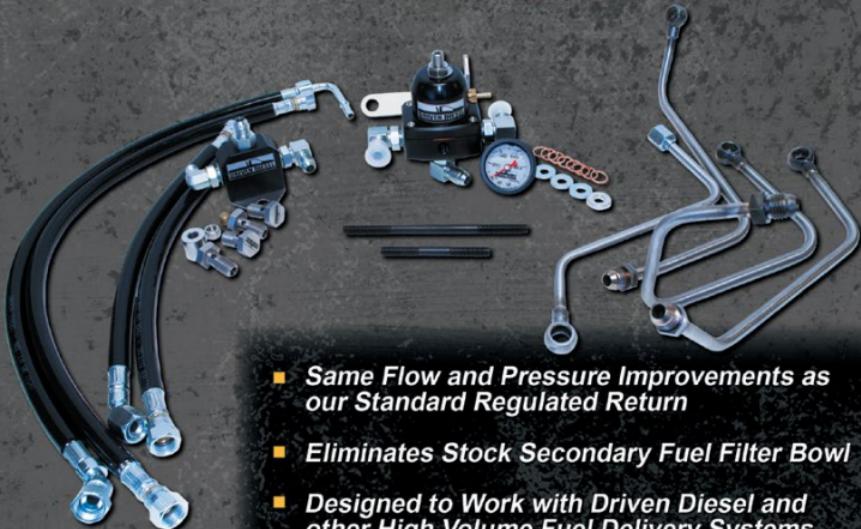
In 1966, Art's focus turned to jet-powered tractor pulling. He went on to win the National Tractor Pulling Association championship in the 9200 Modified Class. After years of experimenting, tinkering, and trying, Art passed away in 2007 and was inducted into the International Motorsports Hall of Fame in 2008. **WTR**



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BY STEVE TEMPLE ◊ PHOTOS: STEVE TEMPLE

Hellwig uses a Ram ProMaster not only as a display vehicle but also to carry large loads of its suspension products. For the '14-to-'15 Ram ProMaster 2500 or 3500, Hellwig's helper spring (Part No. 9665) provides extra load support.



Support Arches

HELPER SPRINGS FOR A RAM PROMASTER VAN

Just as you wouldn't overload a packhorse, it's just not right to overload your workhorse van. Sure, a Ram ProMaster van is designed to carry heavy cargo (rated for 4,440 pounds, max), but nobody would want to drive it nose high. That's a problem Hellwig has been correcting since its founding back in 1946.

For the '14-to-'15 Ram ProMaster, Hellwig's helper spring provides extra load support by inserting another leaf spring underneath the stock leaf pack. Since the extra leaf is progressive, being used more as the suspension compresses, the ride remains smooth when running empty, without jarring the driver.

Note, however, that even with helper springs, the GVWR should not be exceeded. This component is designed to better the suspension's stability and handling when carrying a substantial load. Hellwig makes no claim about increasing the GVWR, since that spec is also based on the frame, suspension, brakes, and ring-gear size. Follow along as we install the helper spring on Hellwig's own ProMaster.



The Ram ProMaster has a gaping cargo area, allowing large loads to be easily maneuvered into the bed with a forklift. But a big load in the rear can create an uneven, nose-high ride, which a Hellwig helper spring can minimize.

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source

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hellwigproducts.com

1, 2. Replace the factory U-bolt nuts with the Hellwig extension nuts. Make sure the machined steps of the new nuts are facing down and reuse the factory washers.

3. Loosely attach the five-hole plate with the stud facing up and only to the tire side of the U-bolts by threading the two 14mm bolts and washers into the extension nuts.

4. Insert the Hellwig helper spring underneath the factory leaf pack. Slide the Hellwig spring between the axle and the five-hole plate with the bumpstops facing up.

5. Attach the Hellwig helper spring by threading the two remaining inner 14mm bolts (with a washer).

through the five-hole plate and into the bottom of the extension nuts already attached to the factory U-bolts. Make sure the bolt is resting in the center hole of the leaf spring as well. Torque the 14mm bolts to 90 ft-lb of torque. After 100 miles, recheck the torques and then check on a regular basis thereafter.

6. Here's how the Hellwig helper spring looks once it's installed. Adding Hellwig helper springs can reduce the amount of compression on the rear spring pack when the cargo bay is heavily loaded.

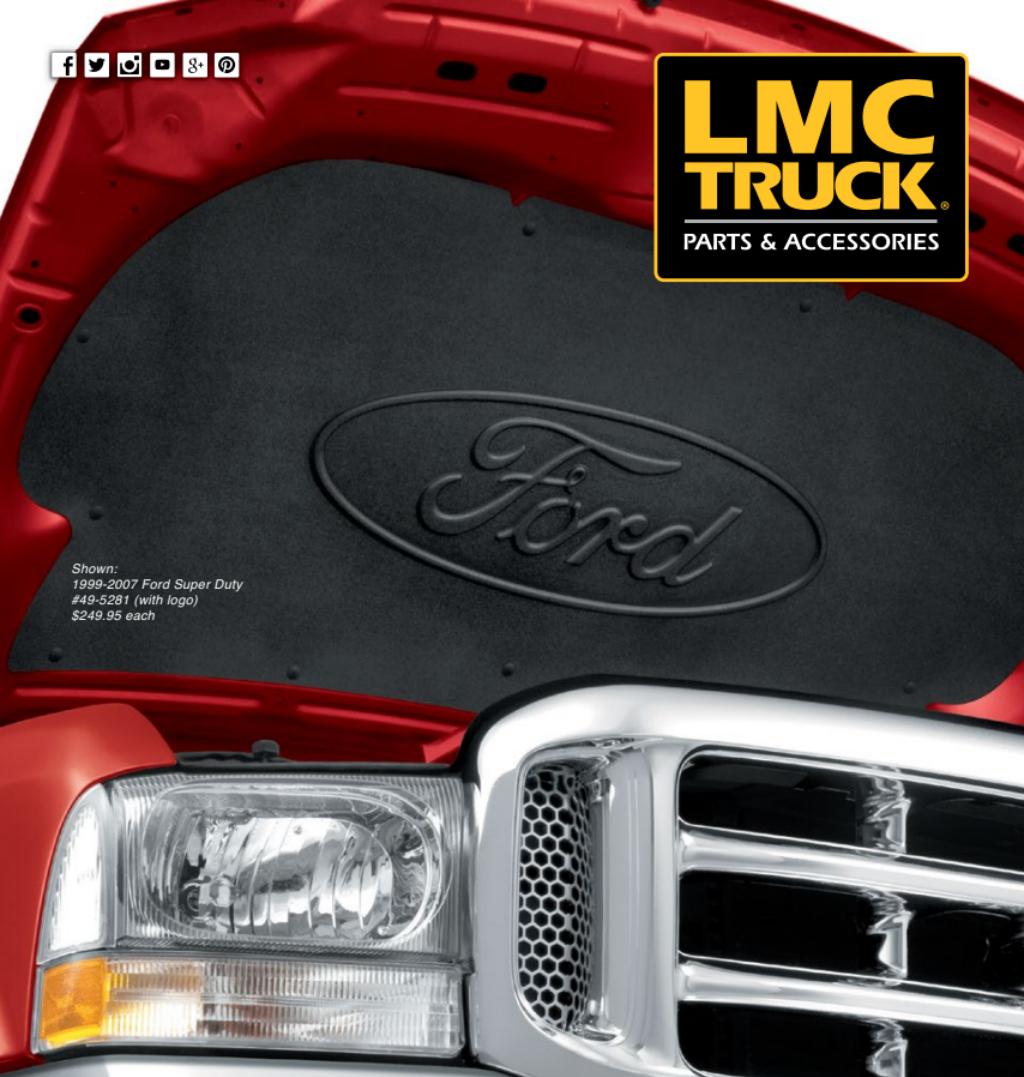
7 Using a Hellwig stabilizer bar in combination with a helper spring is the ideal setup, offsetting both body roll and an uneven suspension load. **WTR**





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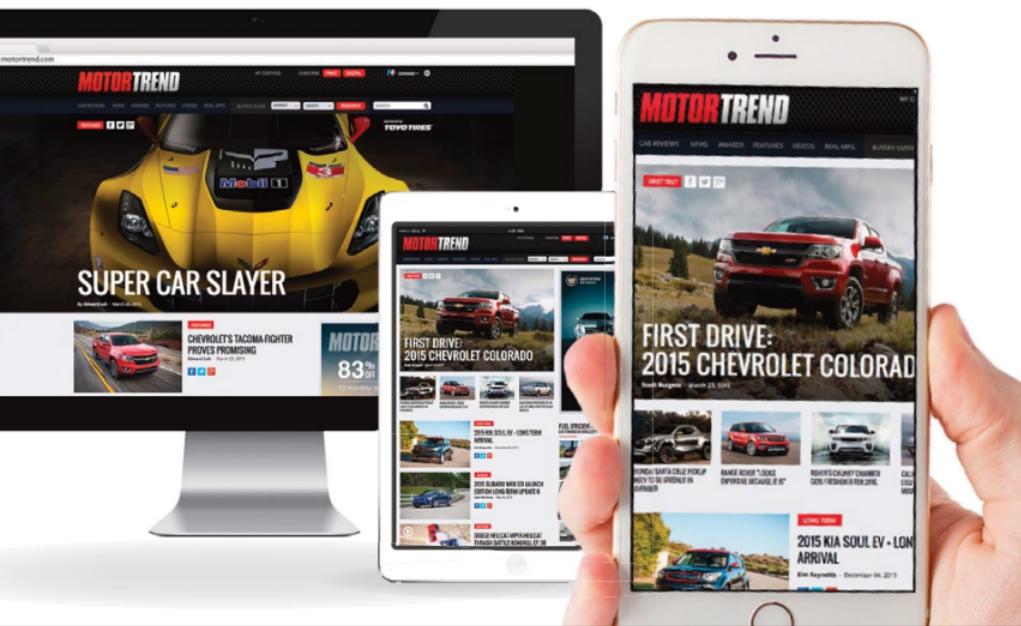
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PRODUCTIVITY



Wrap It Up

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BY BRETT T. EVANS • PHOTOS: BRETT T. EVANS & ROBERT GUIDO

“

t's the best form of advertising, bar none, because it's targeted directly at the areas where you're working.” Those sage words from Mike Smith, the head honcho at Raceskinz, are in reference to vehicle wraps. Whether you drive a small pickup for a local business or operate a fleet of big vans for a nationwide enterprise, wrapping a vehicle with a company logo is one of the most cost-effective ways to advertise a business, Mike says. He would know; he's wrapped hundreds of vehicles, including some that ended up as fully designed and wrapped SEMA show trucks and some that currently roam neighborhoods and suburbs as plumbing trucks, contractors' vehicles, and shuttle vans.

Looking at the blank white slate that was our windowless Nissan NV2500 event support van, we decided Mike was right about localized, targeted advertising. Why not publicize the Truck Trend Network, to which *Work Truck Review* belongs, by wrapping our cargo-hauling beast in high-quality, paint-protecting, attention-grabbing vinyl?

After a few days of design and deliberation, the Truck Trend Network was ready to roll down the road in style, so we turned to Mike and his team at Raceskinz (also known as Kreate Ink) to apply the high-quality printed vinyl to our Nissan.

1

1, 2. "Good prepress is essential," Mike says. Here, Mike's brother and resident Raceskinz graphics expert Tirrell uses a template purchased directly from Nissan to lay out the Truck Trend Network graphics, ensuring any visible or important elements of the design stay out of the window and wheel-arch cutouts. Prepress also helps make sure colors come out of the large-format printer as well as intended.

3, 4. Just as you wouldn't apply paint to a dirty surface, every inch of the body must be prepped and cleaned. This means removing door handles and body trim, loosening and/or removing lights, and meticulously riding any road grime and dirt from the body panels. Not pictured is the painstaking process of eliminating the remnants of the van's old vinyl wrap.

5. With the van cleaned and the vinyl printed and laminated, it's time to put some color on this blank canvas. Mike and Tirrell drape the sheet of vinyl across the hood and line it up where it belongs, then use masking tape to keep the sheet in place and mark its proper position. The sheet then gets gently folded on itself, and half of the backing is removed.

6. Adhesive side down, the wrap is again gently laid across the vehicle surface, and Mike and Tirrell use cloth-covered squeegees to apply the wrap. The vinyl is tougher than it might appear, so the guys can gently yank it off the body if it adheres in the wrong place or a large bubble develops. (Our high-grade vinyl is perforated on a near-microscopic level, meaning imperfections fix themselves over time.) Mike says vinyl quality and coverage are the most important aspects to consider when choosing a supplier.

7. The process repeats itself on the other half of the wrap. One of the important things to remember is to turn the cloth on the squeegee regularly; it will gradually accumulate dust that can scratch the vinyl otherwise.

2**5****3****6****4****7**

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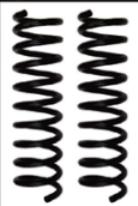
6" Lift Kit R14651K



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2.5" Coil Springs R25



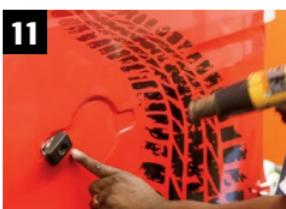
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8. Heat guns loosen the vinyl, making it easier to stretch over compound curves like the ones at the van's front hood corners. However, Tirrell cautions against using too much heat, as the vinyl can shrink and crack when cooling if it's stretched too far. Additionally, the vinyl will burn like an old filmstrip if the heat is left on for too long.

9. Heat applied and vinyl stretched, Mike and Tirrell make cuts along the van's panel gaps. A little more heat will go on the rough edges of the vinyl to help adhere to the undersides of the body panels.

10. The same process is repeated for the leading edge of the van's high-roof cap. It's similar for the rear doors, although each door gets its own piece of vinyl rather than using a single piece that gets split in half.

11. Although the Nissan looks simple and boxy, its body has a number of subtle character lines, including these door handle notches. Once again, heat is applied to the vinyl, allowing it to be "injection-molded" into the divots. Gentle heat, gentle pressure, and patience are the orders of the day for this step.

12. Since the bodywork on the side of the van is relatively feature-free, Mike butts two widths of vinyl together, allowing him to apply them both at the same time. This process saves him an hour on both the driver and passenger side.

13. Mike and Tirrell wrap the side of the van. After positioning the vinyl, they separate it from the backing near the top, then gradually roll the backing down, adhering the vinyl a few inches at a time.

14. Details, details. With vinyl applied to the van's bodysides, hood, bumper, and front and rear caps, Mike and Tirrell go over the design with precision blades, heat guns, and squeegees, ensuring every window gets cut out, each body contour is wrapped perfectly, and all exposed hardware (like these hinges) is butted firmly against the wrap. We won't wrap the hinges, as vinyl doesn't take to those tiny surfaces and moving parts very well. It'd look worse to have peeling vinyl there than exposed hinges. They'll be rattle-canned black, gray, or red.

15. With the wrap fully applied, trimmed, and detailed (and all body parts and lights reinstalled), our van looks the absolute business running down the road. If you see it roaming about Southern California, Colorado, or anywhere else it might be, flag us down and say hello! **WTR**

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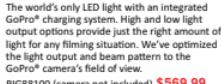
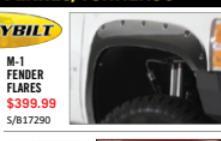


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PRODUCTIVITY

AN INSIDE
LOOK AT
GORILLA
MAD FILM
WRAPS



BY MONICA GONDERMAN • PHOTOS: CULLEN CHEUNG PHOTOS AND TROY DORN

WRAPTOR



"I didn't know if I would really make any money doing this. I just knew I wanted to be excited when I woke up every day for work."

—Troy Dorn

Grafting business and passion together to achieve fulfillment and satisfaction—while still paying the bills—seems a natural goal for small business owners. Troy Dorn, owner of Gorilla Mad Film Wraps, has done just that with his Redmond, Washington-based business. Troy's affinity for drawing started when he was only 2 years old, and from there, his lust for creativity only grew. Fast-forward a bunch of years, and his passion—combined with hard work, dedication, and an expectation of success—grew into a business. Not only is he the owner, but

he is also the sole installer, doing every wrap from start to finish. The only other person working with him at this time is his sales associate.

Troy has wrapped cars, trucks, boats, trailers, buses, and airplanes. However, vehicle wraps are not the be-all and end-all of Troy's business. Other services include commercial graphics, signs, banners, stickers, decals, paint protection, window tint, and all sorts of creative vinyl solutions for businesses. Not bad for a ground-up business that started with a 99-cent razor blade from Home Depot and a \$4 squeegee from eBay. **WTR**



While the end product looks clean, natural, and almost simplistic, wrapping a vehicle is no small task. After all, it isn't your typical lick-'n'-stick venture. From vision to completion, the process requires a lot: a mastery of design to create the graphics, mechanical skill to disassemble and reassemble exterior pieces, and patience to systematically prep and apply the wrap. The end result, exemplified through this urban camo'd Ford Raptor, is well worth it.

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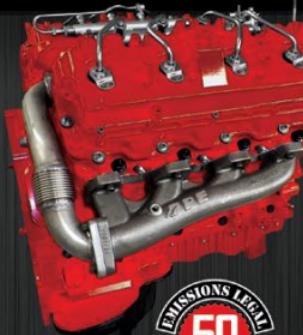
- 2001 LB7 (113064100)
- 2002-2004 LB7 (113064000)
- 2004.5-2005 LLY (113065000)
- 2006-2007 LLY/LBZ (113066000)
- 2007.5-2010 LMM (113067000)
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Our 4R70W automatic transmission had a presumed hard life. It spent its days bolted behind a 5.0L V-8 engine, which racked up 200,000 miles. While we didn't have a catastrophic failure, it was time for it to be gone through. In an effort to get another quarter-million miles from our workhorse transmission, we strapped it to a pallet and shipped it off to the skilled hands at TCI.

It's no secret that trucks are built to work hard, and it's no surprise that parts eventually wear out. Case in point: our 4R70W automatic transmission. With 200,000 miles on the clock, the transmission had a pretty good run, but it was time for an overhaul. Desiring another 200,000 out of a rebuild, we turned to the transmission experts at TCI. What started in 1968 as a shop dedicated to providing high-performance transmission parts to a small group of devout drag racers has grown to be one of the largest and most technologically advanced aftermarket drivetrain companies in the world. So while we could have used the shop down the street, we chose to ship our transmission off and have it not only rebuilt, but also improved. Nothing that enters the shop at TCI is left stock; the crew only provides performance builds.

Our 4R70W is a great testbed to show just what goes into an automatic

transmission rebuild since it was used in such a wide variety of trucks. Ford's AOD transmission begat the AODE, which then spawned the 4R70W. This transmission was used for more than 10 years: 1993 to 2003 in the F-150 pickup, 1997 to 2004 in the Expedition, and 1996 to 2001 in the Explorer (along with the Mustang, Thunderbird, Cougar, Crown Victoria, and many more Ford applications). From there, it grew into the 4R75W, which lived on in the F-Series until 2008.

Even if you don't speak Ford, we hope this article gives a brief glimpse of the inner workings of a modern electronically controlled automatic transmission and what it takes to keep it moving down the road. We also hope to give a little insight into building for performance and longevity. There's no need to scrap a truck when the transmission dies, as a rebuild like this will keep you going for a very long time!

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1, 2. Once the transmission arrived at TCI's headquarters in Ashland, Mississippi, technician Jeff Reed set to work disassembling the slushbox. First up—removal of the transmission pan followed by the valvebody.

3, 4. Next up is the removal of the reverse servo and manual first gear selector, followed by the 3-4 accumulator. When reassembled, a stiffer spring will work to provide increased pressure.

5. Also improved in the valvebody is the overdrive servo. This provides for a firmer 3-4 gear shift and ensures Fourth gear holds solid for many years.

6, 7. With work to the valvebody and servos complete, the next step is to move on to the fun stuff, beginning with removing the pump housing from the transmission body.



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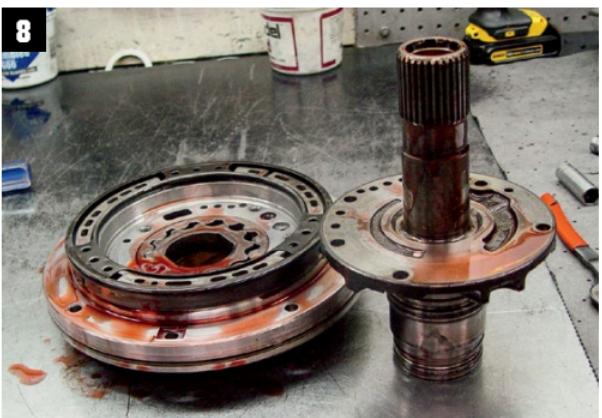
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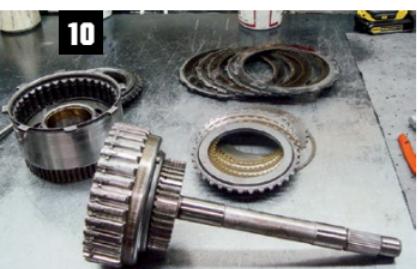
8. One of the most important parts of any automatic transmission is the oil pump. High-pressure fluid is what enables shifting and holds gears, so having a perfectly functioning pump is absolutely crucial. TCI went to task with replacing the pump gears, along with truing the pump face on a surface grinder.

9

9, 10. Next to come out are the reverse drum and intermediate clutches. This is where we spotted the first signs of heavy wear, as the clutches were badly worn.

11. The folks at TCI replace the intermediate shaft of every 4R70W they build with a high-strength steel unit (arrow). This is a common point of failure for these transmissions—and a part you really don't want breaking.

12. Next out is the forward planetary gear housing. For an increase in holding surface area and friction, TCI squeezes in eight clutch plates in the space that originally held six.

10**11****12**



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13, 14 With the transmission fully disassembled, Jeff cleans all the internal parts, inspects everything, and installs new bushings. Also laid out are all the bolts, nuts, thrust washers, and solenoids.

15 The case also undergoes a rigorous cleaning process during which every bolt hole is inspected for bad threads, every passageway is flushed, and a new case bushing is installed. At this point, the transmission is ready to be reassembled.

16 TCI uses Alto Red Eagle high-performance clutches to ensure an extremely long life. Hard parts are cleaned, inspected, and reused. If any defect is found, the part is replaced.

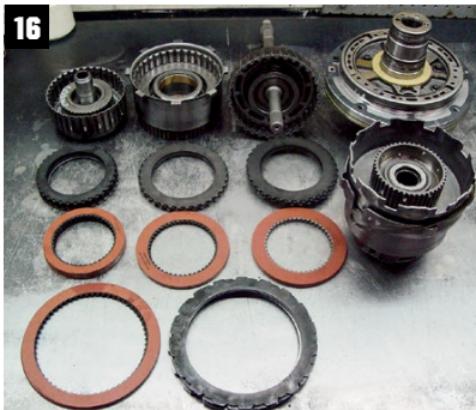
What's a 4R70W?

The 4R70W Ford Overdrive Transmission is an updated version of Ford's long-running AOD transmission that first appeared in the '80s. The nomenclature breaks down like this:

- 4** - Four forward speeds
- R** - Rear-wheel drive
- 70** - Torque rating x 10 (will hold 700 lb-ft)*
- W** - Wide ratio

*Note: This rating is based on torque converter multiplication. It won't stand up to an engine that makes 700 lb-ft at the crank.

Fun Fact: There's no such thing as a non-W 4R70.





17, 18, 19. With the internal parts back in their proper resting places, the pump and valvebody are both installed and torqued to spec. A fresh filter and gasket round out the rebuild.

20 Every transmission TCI builds runs on the company's Axline dyno. This ensures all the critical systems are functional, pressure levels check out, and each unit is completely leak free.

21 Our freshly built 4R70W was returned to us with a new torque converter and fresh coat of paint, ready to slam back into the truck. While this level of rebuild is higher than what most would do, what we have here is something that will keep our truck running for a long, long time. **WTR**



4R70W Gear Ratios

First: 2.84:1
Second: 1.63:1
Third: 1.00:1
Fourth: 0.78:1

source

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Flatbed Tundra

- **YEAR/MAKE/MODEL:** '08 Toyota Tundra SR5 TRD
- **OWNER:** "Chev P"
- **HOMETOWN:** Unknown
- **ENGINE:** 5.7L V-8
- **TRANSMISSION:** Six-speed automatic
- **MODIFICATIONS:** Customized CM Truck Beds flatbed with headache rack bent to match cab contour, cold-air intake, throttle body spacer, 18-inch KMC XD Wheels, and 35-inch Nitto Trail Grappler M/T tires
- **OWNER SAYS:** "It's really unique and a good example of a flatbed Tundra for people who want to know what one looks like. I've never seen one with a flatbed, and neither has the Toyota dealership. It's my daily work truck. It's not perfect, but it looks freaking cool as hell and everybody loves it; it turns heads like crazy." **WTR**



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